CLAIMS:

1. Method of detecting wind velocities by means of a Doppler-lidar system (10), by which a laser beam of a defined wavelength is emitted to a space area (52a, 52b, 52c, 52d) and the light backscattered from the space area is received, for determining the Doppler shift by means of an interferometer (16), an interferogram (34) being generated, and the intensity distribution of the interferogram (34) being measured by means of a photodetector (17)
characterized in that the intensity distribution is compared with a family of reference patterns which were previously determined for defined atmospheric parameter, which comprise different densities and/or temperatures of the atmosphere, from the comparison with the family of different reference patterns, the Doppler shift being determined as a measurement for the wind velocity.

2. Method according to Claim 1,
characterized in that the interferogram (34) is ring-shaped and is imaged directly on the 2-dimensional photodetector (17).

3. Method according to Claim 1,
characterized in that the interferogram is strip-shaped and is imaged directly on the 2-dimensional photodetector.

4. Method according to one of the preceding claims, characterized in that the reference pattern with the slightest deviation with respect to the measured interferogram (34) is used for determining the Doppler shift.

5. Method according to one of the preceding claims, characterized in that the reference pattern contains the velocity of the atmosphere relative to the Doppler-lidar system (10) is a parameter.

6. Method according to one of the preceding claims, characterized in that the variation of the velocity of the atmosphere relative to the Doppler-lidar system (10)) is determined from several successive measurements.

7. Method according to one of the preceding claims, characterized in that the laser beam is pulsed and a portion of a laser pulse is in each case used for defining a time-related reference point in order to determine the distance of the backscattering space area (52a, 52b, 52c, 52d) by means of the transit time of the residual portion of the laser pulse.

8. Method according to one of the preceding claims, characterized in that a portion of the laser beam is received and

recorded directly and without backscattering, from the intensity distribution, a transfer function of optical components being determined and/or a calibration being carried out.

9. Method according to one of the preceding claims, characterized in that the density and/or temperature of the space area (52a, 52b, 52c, 52d) are determined from the reference pattern with the slightest deviation with respect to the measured interferogram (34).

10. Method according to one of the preceding claims, characterized in that it is implemented on board a moving system, preferably on board an airplane (50).

11. Method according to one of the preceding claims, characterized in that the expected intensity distribution of the reference pattern is computed from measured atmospheric parameters and/or flight parameters of an airplane (50).

12. Method according to one of the preceding claims, characterized in that the laser beam is emitted in different directions in order to determine the wind velocity vector by measuring the Doppler shift in these directions.

13. Doppler-lidar system (10) for detecting wind

velocities, particularly on board airplanes (50), having

a transmitting device (12) for emitting a laser beam,

a receiving device (13) for receiving the laser beam backscattered in the atmosphere,

an interferometer (16) for generating an interferogram (34) from the backscattered laser beam,

a photodetector (17) for determining the intensity distribution of the interferogram (34), the interferogram (34) being imaged directly on the photodetector (17), and

an analyzing unit (18a, 18b) for the determination of the Doppler shift as a measurement for the wind velocity of the atmosphere,

characterized in that the analyzing unit (18a, 18b) has a memory (18a) with a family of reference patterns which apply to previously defined atmospheric parameters which comprise different densities and/or temperatures of the atmosphere, and a comparison unit (18b) is provided which determines the wind velocity from a comparison of the imaged interferogram (34) with the family of reference patterns.

14. Doppler-lidar system according to Claim 13, characterized in that the photodetector (17) is a 2-dimensional photodetector which comprises an image intensifier (17a) and a CCD or CMOS array.

15. Doppler-lidar system according to Claim 13 or 14, characterized in that a transfer path (20) for a portion of the laser beam is provided between the transmitting device (12) and the receiving device (13) in order to record the generated laser beam directly in the receiving device (13).

16. Doppler-lidar system according to one of Claims 13 to 15,
characterized in that the interferometer (34) is a Fabry-Perot interferometer which generates ring-shaped interference patterns.

17. Doppler-lidar system according to one of Claims 13 to 16,
characterized in that the interferometer (34) is a Fizeau interferometer which generates strip-shaped interference patterns.

18. Doppler-lidar system according to one of Claims 13 to 17,
characterized by a laser (11) which generates pulsed laser beams in the UV range.

19. Doppler-lidar system according to one of Claims 13 to 18,
characterized by field-programmable gate arrays for computing the

reference patterns.

20. Doppler-lidar system according to one of Claims 13 to 19,
characterized in that the analyzing unit (18a, 18b) comprises a module for determining the transfer function of components on the reception side of the Doppler-lidar system (10).